

Home Office Committee appointed to inquire into this disease.

Of greater theoretical importance was Leitch's demonstration of the carcinogenic action of arsenious acid, and the fact that this factor was not responsible for the carcinogenic action of tar. He also showed that in the production of tar cancer in mice, the essential damage was completed before the appearance of proliferative changes in the skin, although a relatively long latent period might elapse before definite tumour development supervened. This important observation has revolutionised our earlier attitude to the problems of compensation in occupational cancer.

Leitch's numerous publications are characterised by a careful and polished diction, enlivened from time to time by striking and appropriate phrases, which betrayed his literary and classical learning and training. He was an able and attractive speaker, and many of his addresses on formal and informal occasions were enlivened by a wealth of appropriate anecdote. He leaves a widow and four children, to whom will be extended the sympathy of his co-workers at home and abroad.

J. A. MURRAY.

#### MR. R. G. LUNNON.

ROBERT G. LUNNON, who died on Jan. 25 at the age of forty years, was widely known both for his scientific and for his humanitarian work. He was educated at Tottenham County School and University College, London, where he held the Neil Arnott Scholarship of the University of London, and after graduating was appointed to a lectureship in the department of applied mathematics. During the War he served in France with the Red Cross and later was engaged in relief work for refugees in Holland.

In 1919, Mr. Lunnon was appointed lecturer in physics at Armstrong College, Newcastle, where he remained to the time of his death. His work there gave full scope to his many abilities. In addition to his departmental duties, which he discharged with conspicuous success, he undertook a great deal

of work on behalf of the students, and had acted since 1926 as senior tutor in the Faculty of Science. His colleagues were also greatly indebted to him for his work in connexion with the Association of University Teachers, both as secretary and representative on the council. He attended the meetings of the British Association regularly, and served on the committee of Section A.

Mr. Lunnon's published papers relate to a variety of topics, the best known being a series on the motion of spheres in fluid media, which gave evidence of mathematical and experimental ability of a high order. Although extremely active in academic and scientific work, he yet found time for a great deal of social service in various forms. These are too numerous to detail; but the cause of international goodwill was perhaps the one nearest his heart, and he laboured to promote it with all the enthusiasm and energy that was in him. His students, his colleagues, and his many friends will always remember him with gratitude as one who had great gifts and used them to the full—but always on behalf of others.

WE regret to announce the following deaths:

Sir Andrew Balfour, K.C.M.G., director of the London School of Hygiene and Tropical Medicine, on Jan. 30, aged fifty-seven years.

Dr. W. E. Johnson, Sidgwick lecturer in moral philosophy in the University of Cambridge, and author of a work on "Logic", three volumes of which out of the four contemplated have been published, on Jan. 14, aged seventy-two years.

Prof. Orazio Marucchi, professor of archæology at the University of Rome and director of the Vatican Egyptian Museum, on Jan. 21, aged seventy-seven years.

Dr. R. B. Moore, formerly chief chemist of the U.S. Bureau of Mines and recently professor of chemistry in Purdue University, who was known for his work on radioactivity, applied chemistry and metallurgy, aged sixty years.

Dr. J. Perrin Smith, emeritus professor of palæontology at Stanford University, with which he had been connected since 1892, on Jan. 1, aged sixty-six years.

#### News and Views.

THE causes of the present agricultural depression in Great Britain are reviewed by Mr. C. S. Orwin, director of the Institute for Research in Agricultural Economics at Oxford, in an article in the *Political Quarterly*, vol. 2, No. 1, entitled "The Agricultural Problem". Although the assertion that in previous years wages have been based entirely on the price of wheat is probably an over-statement, it is evident that at the present time wages are fixed with reference to a standard of living regardless of the condition of the industry, and the fact that the necessity for paying a statutory wage continues, while the guarantee for prices has been withdrawn, constitutes one of the farmer's chief complaints. From a comparison of the costs of production of such commodities as wheat, mutton, and milk for the years 1914, 1925, and 1930, it appears that for the two earlier years the corre-

sponding figures were almost identical, and even in 1930 the cost of production has only risen appreciably in the case of wheat. The problem is, therefore, mainly one for the arable farmer; but the obvious course of abandoning corn-growing in favour of the more profitable industries is no solution for the eastern districts, where climatic conditions are unsuitable for dairying or market gardening; and further, the transformation of these areas into sheep farms could only be done at a great sacrifice of employment and production.

THE solution of the present agricultural problem, Mr. Orwin thinks, lies in a readjustment of the principles underlying arable farming. In the first place, he questions the advisability of continuing mixed farming, which includes the production of both corn

and meat. Times have changed since man was entirely dependent on farmyard manure for the growth of his crops. The labour involved in its production and the cost of internal farm transport he regards as unnecessary, whereas an interdependent system of live stock and corn farming might prove quite economical. In another aspect also, a break with tradition is recommended. Farm and fields were originally laid out in sizes convenient for horse labour, but with the development of the tractor and other forms of mechanical power, some readjustment of areas is needed for efficient working. The argument that such an industrialisation of agriculture will only aggravate the unemployment problem is ruled out, as much poor grass land could be profitably used for corn-growing if only the cost of production could be reduced. A warning is added of the danger of over-production if farmers rely solely on those branches of the industry which tend to be profitable at the moment, and emphasis is laid on the necessity for fundamental reorganisation if the solution of the present problem is to be permanent.

THE trustees of the London Museum have made a new departure in museum work by instituting a studentship for the encouragement of research in some subject germane to the interests of the museum. They have been enabled to take this step through the generosity of Viscount Esher, who has placed at the disposal of the trustees the sum of £300 per annum as a memorial to his father, the late Lord Esher, one of the founders of the museum. The studentship will be awarded "for the purpose of promoting research into some aspect of the history or archaeology of London, whether by documentary research, by excavation, by museum work, or by a combination of these methods". The award will be made by the trustees on the recommendation of an advisory committee, on which representatives of the Society of Antiquaries, the British Academy, and the universities of Oxford, Cambridge, and London will serve, and the tenure will be normally for a period of two years. The researches of the student will be incorporated in a thesis, which may, in due course, be published at the direction of the trustees. It is hoped that, in the course of years, a very substantial amount of useful and original material bearing directly or indirectly upon the arts, crafts, and history of the metropolis will be collected. The scheme may be regarded as an interesting experiment in the development of that extra-mural work which is now regarded as appropriate to our national museums. Entries for this studentship are invited on or before Mar. 14.

TOWARDS the end of last month several earthquakes were recorded at Kew Observatory. On Jan. 27, at 8 h. 20 m. 59 s. P.M., the first vibrations of a great earthquake reached Kew, from a centre in about lat. 26° N., long. 98° E., or near the south-west border of China. Of this earthquake no direct news has yet come or is likely to come. A few hours later, at 5 h. 59 m. 37 s. A.M. on Jan. 28, there was another, though of much less importance, with an origin about 1260 miles from Kew: no doubt the same as that re-

ported in the *Times* for Jan. 29 as having caused much damage and some loss of life at Koritza in Albania, one of the most active earthquake centres in that country. At 9 h. 43 m. 6 s. P.M. on the same day an earthquake of moderate intensity was recorded with its epicentre in about lat. 7° N., long. 142° E., or in the western Pacific to the north of New Guinea. The U.S. Coast and Geodetic Survey (according to a *Daily Science News Bulletin* issued by Science Service, Washington, D.C.), with the aid of fourteen seismograms, has estimated the position of the Mexican earthquake of Jan. 14 to be in lat. 16° N., long. 96° W., or close to the coast of the Gulf of Tehuantepec, and also to the origin of another destructive earthquake on Mar. 22, 1928. An earthquake of great intensity occurred in North Island, New Zealand, on Feb. 3. The first shock was noted at 8.51 A.M., and shocks continued for two hours. The epicentre appears to have been submarine and in the vicinity of Napier, which has a population of 19,000, and the main portion of the city has collapsed. A heavy death-roll is estimated in Napier and for many miles around. A sea wave followed the earthquake.

IN his presidential address to the Royal Microscopical Society delivered on Jan. 21, Prof. R. Ruggles Gates reviewed certain aspects of the history of the Society showing its importance in the development of biology, and cited some of the eminent scientific men who had taken part in its work. Prof. Gates then discussed adaptations in cell structure. He cited various cases of complicated structures in the Protozoa, and referred to the widespread occurrence of cilia in many animal and plant cells. The mechanism of mitosis or nuclear division was treated as an adaptive mechanism which originated very early in evolution and made possible the multicellular structure of higher organisms, at the same time serving to perpetuate many of the differences arising through variation. The capillitium in Mycetozoa and puff-balls, the elaters of Liverworts and of *Equisetum*, were discussed as examples of evolutionary adaptation, arriving at the same goal by different paths. The development of the spiral markings in wood cells was explained; and the long, coiled suspensors of Conifer embryos were treated as a study in adaptation and over-specialisation through competition between the young embryos and the principle of developmental selection. The frequency of parallel mutations in the evolutionary development of many cell structures was emphasised, and it was shown that the principles of adaptation in cell structures are the same as in the development of adaptations in the organism as a whole.

FOR his lecture on the beginnings of tropical medicine, before the London School of Hygiene and Tropical Medicine on Feb. 3, Dr. P. Manson-Bahr chose the life and work of Patrick Manson as the chief topic. Patrick Manson, to whom the London School of Hygiene and Tropical Medicine owes its inception and its very existence, was one of the most original and outstanding medical personalities of the last century. Not only did he himself make many original and lasting discoveries in the field of medicine, but also he

laid the foundations of the science of tropical medicine. Born on Oct. 3, 1844, he graduated at the University of Aberdeen in 1865, and then proceeded to Formosa and worked there as well as in Amoy, China, for ten years before seriously interesting himself in the scientific side of medicine. It was in 1875 that he first saw the microscopic embryo filaria in the blood of the local Chinese, and it was in the elucidation of the life history of this parasite that he first achieved everlasting fame. He was the first to recognise that this small worm was to be found in countless numbers in the blood at night time, and recognised that its peculiar habits and structure were adapted to a second life in the body of a mosquito. This insect he proved to be an essential intermediary in its transference from one human being to another and in its growth into an adult worm, which was afterwards found to inhabit the lymphatic tissue and to attain the length of nearly two inches. In 1892 he commenced to study malaria seriously, and deduced the probable life history of this parasite from what he had already ascertained to be the case in the filaria. In 1894 he formulated his mosquito-malaria hypothesis and became associated with Ronald Ross. It was the outcome of this ideal collaboration which resulted in the verification of the complete cycle of the malaria parasite in the *Anopheles* mosquito in 1898. In 1897 Manson became medical adviser to the Colonial Office, and became intimately associated with Joseph Chamberlain in schemes for the betterment of health conditions in the Colonies. The first outcome of this collaboration was the foundation of the London School of Tropical Medicine in 1899.

DR. G. A. REISNER, director of the joint expedition of the Boston Fine Arts Museum and Harvard University in Egypt, has recently given an account at Cairo of his excavations in Giza Cemetery and the Pyramid area, and summarised the evidence bearing on the development of Egyptian ideas on the life after death and the cult of the dead in the Old Kingdom. A report of two lectures, delivered on Jan. 16 and 20, is given by the Cairo correspondent of the *Times* in the issue of Jan. 31. The Egyptian tomb consisted of two parts, the burial chamber and the offering place, the former being originally a square pit excavated in the gravel, which developed finally into a stone mastaba or pyramid. The construction of the pyramids in the great cemetery of Giza, founded by Cheops, the second king of the fourth dynasty, employed tens of thousands of men on unproductive labour, and by the end of that dynasty the population was supporting a large body of priests to feed the dead of centuries. The funerary priest was a civil functionary who, as a result of contact with an individual, became the servant of his *ka*. By a contract, the functionary and his heirs in perpetuity became owners of land, in return for maintenance of offerings in the funerary chapel of the dead. The pyramid cities housing these functionaries, who enjoyed immunity from taxation and forced labour, were crowded with inhabitants. In tracing the development of other features of the cult—the slab

stelæ, the wall paintings, the festivals of the dead, and so forth—Dr. Reisner sketched a remarkable picture of the Cemetery of Giza as a city of living spirits whose daily needs were supplied by the living servants they had engaged while themselves still living.

THE Electricity Commissioners held an exhaustive public inquiry on the application of the Fulham Borough Council for permission to extend its Townmead Road generating station. Judging by the rapid and increasing demand for electric power in the south-east England area, there could be no question about the usefulness of this station; but there was considerable opposition on the ground that it would seriously affect the amenities of the neighbourhood. It was suggested that the required power could be obtained by building a new power station on the lower reaches of the Thames. If this were done, a transmission system at least 18.5 miles long would have to be provided. Numerous high tension cables would therefore need to be provided, and a survey showed that it would be very difficult, if not impossible, to find room for these cables, owing to the existing congestion under the streets. The alternative method of laying cables along the bed of the Thames was not considered practicable. The loss in transmission due to heating the cables would be about £150,000 a year, and there would in addition be very heavy capital charges. To make extensions by building a number of small stations would about double the cost. The Commissioners came to the conclusion that any nuisance arising from the emission of grit and sulphurous fumes could be obviated by the installation of modern devices. By observing also the conditions laid down by the Port of London Authority, the effluent from this plant can be rendered harmless. Assuming that the Fulham Borough Council take the best known precautions for the due consumption of smoke and for preventing so far as reasonably practicable the evolution of oxides of sulphur, the Commissioners gave their consent to the proposed extensions on Jan. 27.

It seems highly probable that in a few years' time much of our electric lighting will be done by incandescent gases in luminous tubes and not by incandescent filaments. This kind of lighting is generally referred to as neon lighting, but argon, helium, krypton, and other gases are used. Although Lord Rayleigh and Sir William Ramsay were the first to separate these gases from the atmosphere, yet the commercial development of them for lighting purposes is mainly due to Georges Claude in France. There are now about a hundred companies in various parts of the world exploiting his patents and all bound together by an agreement to interchange technical information and research results. All the countries concerned have a common interest in advancing the science of tubular lighting. In the December *Journal* of the Junior Institution of Engineers an abstract is given of a lecture by H. Marryat describing many of the recent advances that have been made. In the Paris factory the great difficulties in the way of introducing a minute quantity of an absolutely pure gas into an

absolutely clean tube were finally overcome by the introduction into the factory of the methods of the precise scientific worker. Neon tubes are familiar in London from being used for advertisement lighting. The original voltage used was 32,000, but it has now been reduced to 1000, and tubes have been made in the laboratory that will work at 200. At present their most important use is for the lighting of aerodromes and air routes. The light from Croydon beacon can be seen by airmen when flying over France. Luminous signals are employed to indicate to the pilot the velocity of the wind and its direction at ground level, so that he may alight against the wind at the correct speed. For domestic lighting, however, we have to await the commercial development of the white tubular light, which laboratory experiments have shown to be a very desirable one.

IN the *Westinghouse International Journal* for January there is an interesting account of a device for controlling traffic which is being adopted in several towns in the United States and is a modification of the 'Stop and Go' light system. In many main streets the traffic is always heavier than on a little-used intersecting street; hence the traffic may be held up in the main street although there are no vehicles using the side street. In order to obviate this drawback, a device is used in connexion with the 'Stop and Go' light whereby the latter only shines red down the main street when a motor vehicle approaches the intersection from the side street. The device is based on the principle of the photo-electric cell, and is mounted on a pedestal three feet above the curbstone in the side street, near the crossing. When a vehicle approaches from the side street it necessarily has to stop, and in this position it intercepts a beam of light which falls on a device called the 'electric eye'. The interruption of this light beam automatically changes the visible signal facing the side street from red to green and the signal in the main street from green to red for an interval long enough to enable the motorist to cross the main street. This device enables the traffic speed to be greatly increased, and is working well in everyday use.

DR. J. ROBINSON, formerly chief of the Radio Research Department of the Royal Air Force, has invented a system of multiplex telegraphy. A demonstration of it was given on Jan. 20, at the offices of the *Daily Mirror*, using a line to Bristol and back, a distance of about 240 miles. The line was specially lent by the Postmaster-General for the development of the method, and both sending and receiving instruments were in the same room. The main advantage claimed for the method is that by its use more than twice as many messages as are now possible can be sent simultaneously over one wire. In England only six channel frequencies are employed; but in America twelve are sometimes used. The stenode radiostat system uses a separate audible frequency for each of the messages sent. The transmission is carried out by modulating each audible frequency at a speed which is determined by the speed of sending. It is claimed that with this type of receiver the broad

spacing of the frequencies made necessary in practice to avoid overlapping has been considerably reduced. The selectivity of the instrument is due to the successful use of tuning-forks as electrical filters. At the demonstration, the channel frequencies were placed apart by only a hundred cycles a second. At this spacing, communication of 80 words a minute was carried out.

DR. F. S. SINNATT, deputy director of fuel research, in a public lecture delivered on Feb. 2 at the Sir John Cass Technical Institute, E.C.3, gave an account of the work being carried out by the Coal Survey, which is one item in the programme of work of the Fuel Research Division of the Department of Scientific and Industrial Research. The Survey is undertaking a systematic investigation of the coal seams of Great Britain, and in order to carry out the work committees have been appointed in all the major coalfields of the country and laboratories have been established at convenient centres. The work is now in progress in Scotland, Northumberland and Durham, West Yorkshire, South Yorkshire, North Staffordshire, Nottinghamshire and Derbyshire, and South Wales, while a laboratory is being equipped to serve the coalfields of Warwickshire, Cannock Chase, and South Staffordshire. Upon the technical side the investigations are carried out by obtaining a solid pillar of coal representing the whole thickness of the seam, and transporting this to the laboratory, where it may be investigated in detail. Certain parts of the analyses are carried out rapidly so as to prevent changes due to oxidation, etc., and the seam is then examined for its physical characteristics and, if necessary, divided into a number of layers, depending upon the character of the seam. Samples of the various coals are obtained and submitted in the first instance to proximate analysis, together with the estimation of sulphur and the determination of the calorific value. The broad properties of the seam are then reviewed, and after consultation with the staff of the colliery the number of layers which will be examined in greater detail is decided upon. The seam as a whole and the various layers are then examined exhaustively. It is the object of the survey to trace the variations of the seams throughout the coalfield, and to correlate with this change in properties the possible effect they will have upon the way in which the seam is utilised commercially.

SIR J. J. THOMSON will receive the Dalton Medal of the Manchester Literary and Philosophical Society when he delivers the Dalton Lecture before the Society on Mar. 17, 1931.

THE Second Pedler Lecture of the Chemical Society, entitled "Studies on Biological Oxidation", will be delivered by Prof. H. Wieland, of Munich, on Friday, Mar. 6, at 5.30 P.M., in the meeting hall of the Institution of Mechanical Engineers. Admission is free, without ticket.

THE second course of Scott Lectures at the University of Cambridge will be delivered by Dr. Irving Langmuir, of the Research Laboratories of the General

Electric Company, Schenectady, N.Y., in the Caven-  
dish Laboratory, at 4.45 P.M., on Feb. 9, 11, 13, 16,  
and 18. The subject for this course is "Fundamental  
Phenomena in Electrical Discharges in Gases". The  
lectures are open without fee to all members of the  
University.

THE University of St. Andrews has sent its con-  
gratulations to Dr. W. W. Keen, of Philadelphia, one of  
its honorary graduates, on his attainment, on Jan. 19,  
of the age of ninety-four years. It is twenty-three  
years since Dr. Keen resigned the professorship of  
surgery at Jefferson Medical College. The honorary  
degree of LL.D. was conferred upon him by the Uni-  
versity of St. Andrews in 1911, during the celebration  
of the five-hundredth anniversary of the foundation of  
the University. Dr. Keen's longevity and cheerful  
hardihood are matched by those of emeritus Prof.  
W. C. M'Intosh, also of St. Andrews, who is ninety-two  
years of age and is still busy with scientific work.

THE following committee has been set up jointly by  
the First Commissioner of Works and the President of  
the Board of Education, to consider the recommenda-  
tion of the recent Royal Commission on National  
Museums and Galleries that a national folk museum  
should be established, if possible, in London, and also  
to advise as to the practicability and cost of establish-  
ing such a museum: Sir Lionel Earle (chairman), Mr.  
E. R. D. Maclagan, Mr. E. S. Makower, Sir Henry  
Miers, Prof. J. L. Myres, Mr. C. R. Peers, Sir Henry  
Richards, and Dr. R. E. Mortimer Wheeler. The  
secretary is Mr. E. F. Muir, Ancient Monuments  
Branch, Office of Works, London, S.W.1.

AT the annual general meeting of the Royal Micro-  
scopical Society, held on Jan. 21 at B.M.A. House,  
Tavistock Square W.C.1, the following officers and  
new members of council were elected: *President*—  
Prof. R. Ruggles Gates; *Treasurer*—Mr. Cyril F.  
Hill; *Secretaries*—Mr. J. E. Barnard, Dr. Clarence  
Tierney; *New Members of Council*—Mr. C. Beck, Mr.  
G. R. Bullock-Webster, Prof. R. T. Hewlett; *Librarian*  
—Dr. Clarence Tierney; *Curator of Instruments*—Mr.  
W. E. Watson Baker; *Curator of Slides*—Mr. E. J.  
Sheppard.

THE provisional figures of the vital statistics for  
England and Wales for 1930 have been issued by the  
General Register Office. The rates per 1000 popula-  
tion were: for births, 16.3, the same as for 1929,  
which was the lowest recorded; and for deaths, 11.5.  
The death rate is 1.9 below that for 1929, and is the  
lowest recorded, being 0.1 below the rates for 1923  
and 1926, the previous lowest. The infant mortality  
rate (deaths under one year per 1000 live births) was  
60, and was also the lowest on record, being 5 per  
1000 below that for 1928, the previous lowest, and  
14 per 1000 below that for 1929.

MESSRS. Flatters and Garnett, Ltd., of Man-  
chester, have issued a new catalogue of lantern slides  
illustrative of the various branches of science. There  
is a very wide range of types amongst this collection,  
from plain and coloured photographs of geological

interest to macroscopic pictures of plants and micro-  
scopic photographs and diagrams of Protozoa and  
Protozoa. The list in all branches, and especially that  
of botany, has been greatly enlarged. This is due  
chiefly to Mr. Flatters, who is especially interested in  
the study of plants from the anatomical and histo-  
logical point of view. Messrs. Flatters and Garnett,  
Ltd., take full advantage of the fact that their estab-  
lishment is close to the University of Manchester.  
Members attend the public lectures, meetings, and  
exhibitions which are held in the University, and their  
assistants are sent to the evening course in biology.  
Thus much valuable information with regard to the  
production of lantern slides, the type required, the  
arrangement of lists, and so forth, is obtained. The  
lantern slides produced by Messrs. Flatters and Gar-  
nett, Ltd., are invaluable assets to the public lecturer,  
the university lecturer, and the school teacher.

MESSRS. W. Heffer and Sons, Ltd., Cambridge, will  
publish shortly "The Scientific Detective and the  
Expert Witness", by Dr. C. Ainsworth Mitchell,  
which work aims at giving a more or less popular  
description of the methods by which those with  
specialised training have been able to assist in solving  
problems constantly arising in criminal investigation.

THE Museum of Comparative Zoology at Harvard  
University announces that the first volume of a check  
list of the birds of the world by James Lee Peters is  
now in press and will be issued shortly. The classifica-  
tion followed for the higher groups is that proposed  
by Dr. Wetmore, with the sequence of genera and  
species according to the author's own ideas where  
no authoritative treatment has been published. The  
first volume will contain about three hundred genera  
and one thousand seven hundred species and sub-  
species. It is expected that at least ten volumes  
will be required to complete the work. The second  
volume is in active preparation and preliminary work  
on others is under way. The new check list is not a  
Museum publication and will not be distributed to  
the Museum's exchange list, but will be sold by the  
Harvard University Press.

APPLICATIONS are invited for the following ap-  
pointments, on or before the dates mentioned:—A  
professor of anatomy in the Madras Medical College  
and a professor of anatomy and physiology in Vizaga-  
patam Medical College—The High Commissioner for  
India, General Department, India House, Aldwych,  
W.C.2 (Feb. 10). A principal of the Acton Technical  
College—The Secretary (F), 10 Great George Street,  
Westminster, S.W.1 (Feb. 14). A museum assistant  
in the Leicester Museum and Art Gallery—The  
Director, Museum and Art Gallery, Leicester (Feb. 16).  
Inspectors under the Ministry of Agriculture and  
Fisheries, for the purposes of the Diseases of Animals  
Acts, 1894–1925—The Secretary, Ministry of Agri-  
culture and Fisheries, 10 Whitehall Place, S.W.1  
(Feb. 16). A temporary assistant mycologist under the  
Department of Agriculture for Scotland, for work in  
connexion with bracken disease—The Establishment  
Officer, Department of Agriculture for Scotland,  
Queen Street, Edinburgh (Feb. 16). A principal of

the Kingston-upon-Thames Technical College—The Secretary, Education Department, County Hall, Kingston-upon-Thames (Feb. 21). Inspectors under the Board of Education, for technical and evening schools—The Secretary, Board of Education, Whitehall, S.W.1 (Feb. 21). A senior lecturer in physics in the University of Cape Town—The Secretary, Office of the High Commissioner for the Union of South Africa, 73 Strand, W.C.2 (Feb. 24). A University reader in mathematics at Westfield College—The Academic Registrar, University of London, South Kensington, S.W.7 (Feb. 27). A lecturer in physics at Armstrong College—The Registrar, Armstrong

College, Newcastle-upon-Tyne (Mar. 5). Assistant examiners in the Patent Office—The Secretary, Civil Service Commission, Burlington Gardens, S.W.1 (June 4). A temporary science master at Merchant Taylors' School, for chemistry (or possibly physics) during May, June, and July—The Headmaster, Merchant Taylors' School, Charterhouse Square, E.C.1. A Grade "E" technical assistant in the Signals Experimental Establishment—The Superintendent, Signals Experimental Establishment, Woolwich Common, S.E.18. An advisory veterinary officer at Reading University, for the Southern Province—The Registrar, The University, Reading.

### Our Astronomical Column.

**Registration of Solar Prominences.**—In a recent issue (No. 88) of the *Bulletin* of the Kodaikanal Observatory—a biannual publication containing current observations of solar prominences and disc phenomena recorded spectroscopically at Kodaikanal—the Director, Dr. T. Royds, directs attention to the publication of additional data of prominences photographed in hydrogen light ( $H\alpha$ ). There are two spectroheliographs in daily use at this observatory, one of which is used for obtaining composite photographs showing the disc markings and the prominences at the sun's limbs in calcium light (K), whilst the other instrument is employed for registering the disc markings in hydrogen ( $H\alpha$ ) light. Owing to the increased speed of panchromatic plates, it has been found possible to include in the daily programme since Jan. 1, 1929, the registration of the prominences in hydrogen light. Dr. Royds finds that the mean daily areas of  $H\alpha$  prominences in 1929 are considerably less, about 54 per cent, than those of the calcium prominences. This, he points out, is not necessarily to be interpreted as evidence that the hydrogen prominences are less extensive or less high than calcium prominences, for there are numerous examples where individual prominences are identical in shape, height, and area in the  $H\alpha$  and the K photographs. There is, however, considerable evidence that in the fainter and more scattered parts of K prominences the  $H\alpha$  counterpart is relatively much fainter when compared with the brighter parts of the prominence. This is not a photographic effect caused by the under-exposure of the  $H\alpha$  plate, for whilst the main part of a prominence may be stronger in the  $H\alpha$  photograph than in the calcium, the reverse is often true in the fainter parts of the same prominence. The exact relations between the relative intensities in different parts of  $H\alpha$  and K prominences require further study, and it is very satisfactory that data for this purpose will be accumulated at Kodaikanal.

**Rotation Period of Uranus.**—The two most trustworthy determinations of this period were those made by Profs. Lowell and Slipher at Flagstaff in 1911 and that of Mr. L. Campbell in 1917; the former was spectroscopic, the latter by light-variation. The results were practically identical,  $10^h 50^m$  and  $10^h 49^m$  respectively. But there was considered to be room for a further investigation, since the indicated probable error of the spectroscopic method was 17 minutes, and the light-variation was not confirmed by several other observers. It may, however, have been produced by a temporary marking. *Pub. Ast. Soc. Pac.* for December contains an account of a new spectroscopic determination made by Messrs. Moore and Menzel. They used a higher dispersion than Lowell and Slipher, also the equator of Uranus is more nearly central on the disc. Their weighted mean

is  $10^h 50^m$  with a probable error of  $10^m$ ; but in spite of the close accord with the previous results, they do not consider that the period is certainly known within several minutes; Mr. Moore's results, taken alone, give  $11^h 18^m$  and those of Mr. Menzel  $10^h 26^m$ . The uncertainty arises from the small size of the disc of Uranus. It will be remembered that in their Neptune investigation they estimated the uncertainty as a full hour.

The *Gaz. Astron.* for January announces that M. V. Tshernov has been making photometric observations of Uranus during the autumn of 1930. He finds for the period of rotation  $10^h 47^m 34^s$ . Before opposition the range of magnitude was from 5.97 to 6.16; after opposition, from 5.78 to 6.10.

**The Radial Velocities of the Spiral Nebulae.**—Prof. C. D. Perrine notes in *Astr. Nach.*, No. 5754, that radial velocities of recession approaching 10,000 km. sec. have been deduced at Mount Wilson for some of the faint distant spirals. He makes the suggestion that the annual aberration of these objects should be compared with that of neighbouring stars; according to former ideas, since these bodies are receding with a velocity one-thirtieth of that of light, the velocity of their light-waves relatively to the observer would be less than that of the stars in the same proportion. Hence the constant of aberration for them should be greater than for the stars by 0.7"; a quantity easily measurable on good photographs.

According to Einstein's theory the apparent velocity of the light is constant for all objects. But just as observations of the Einstein shift of stars near the sun are still made during total eclipses, it would seem to be worth while to make this experiment in order to test the theory further. Photographs should be taken as nearly as possible at the times when the objects are at the two ends of the major axis of the aberration ellipse.

**Minor Planets.**—*Kleine Planeten* for 1931 (published by the Berlin Rechen-Institut) indicates that there are now 1152 numbered planets, five of those discovered in 1930 having been already numbered. Many planets that were long missing have been picked up, and there are now only five planets in the first 400 that have been lost since the year of their discovery. Many new names have been given; the seventh Trojan planet, discovered in 1929, has been named Odysseus. The names Probitas, Perseverantia, and Hilaritas have been given to three planets discovered by the late Dr. Palisa of Vienna, being regarded as expressing qualities of his character. A group of planets are named after flowers: Begonia, Camellia, Petunia, Primula. Planet 1134 is named Kepler.